

## SUPPLEMENTAL MATERIAL

### Manuscript Title - Review:

#### **Exposure Assessment in Cohort Studies of Childhood Asthma**

### Authors names:

Victoria H. Arrandale<sup>1</sup>, Michael Brauer<sup>2</sup>, Jeffrey R. Brook<sup>3,1</sup>, Bert Brunekreef<sup>4</sup>, Diane R. Gold<sup>5</sup>, Stephanie J. London<sup>6</sup>, J. David Miller<sup>7</sup>, Halûk Özkaynak<sup>8</sup>, Nola M. Ries<sup>9</sup>, Malcolm R. Sears<sup>10</sup>, Frances S. Silverman<sup>1</sup>, Timothy K. Takaro<sup>11</sup>

### Author Affiliations:

<sup>1</sup> Dalla Lana School of Public Health, Gage Occupational & Environmental Health Unit, University of Toronto, Canada

<sup>2</sup> School of Environmental Health, University of British Columbia, Canada

<sup>3</sup> Environment Canada, Air Quality Research Division, Toronto, Canada

<sup>4</sup> Institute for Risk Assessment Sciences, Division of Environmental Epidemiology, Utrecht University, Netherlands

<sup>5</sup> Department of Environmental Health, Harvard School of Public Health, Boston, USA

<sup>6</sup> National Institute of Environmental Health Sciences, Research Triangle Park, NC, USA

<sup>7</sup> College of Natural Sciences, Carleton University, Ottawa, Canada

<sup>8</sup> US Environmental Protection Agency, Research Triangle Park, NC, USA

<sup>9</sup> Health Law Institute, University of Alberta, Canada, Faculty of Law & School of Health Information Science, University of Victoria, Canada

<sup>10</sup> Firestone Institute for Respiratory Health, McMaster University, Hamilton, Canada

<sup>11</sup> Faculty of Health Sciences, Simon Fraser University, Burnaby, Canada

Corresponding Author:

Jeffrey R. Brook, PhD  
Environment Canada  
4905 Dufferin St.  
Toronto ON Canada M3H 5T4  
Tel. (416) 739-4916  
Jeff.Brook@ec.gc.ca

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Table 1 Examples of environment-related factors/exposures that have been previously associated with the development or exacerbation of childhood asthma (not limited to cohort studies).

Antibiotic use (Alm et al. 2008; Kozyrskyj et al. 2007; Kummeling et al. 2007)	Atopy (Arshad et al. 2005; Kihlstrom et al. 2004)
Birth Order/Sibship size (Bernsen et al. 2003; Maitra et al. 2004; Strachan 1989)	Birth weight (Gold et al. 1999; Kiechl-Kohlendorfer et al. 2007; Sin et al. 2004)
Breastfeeding, mixed associations (Kramer et al. 2007; Oddy 2000; Wright et al. 2000)	Caesarian section (Renz-Polster et al. 2005; Salam et al. 2006)
Chloramines (swimming pools) (Bernard et al. 2006; Bernard et al. 2007)	Diet (Vit D, fish consumption) (Nafstad et al. 2003; Oddy et al. 2004; Romieu et al. 2007; Salam et al. 2005; Willers et al. 2007)
Early childhood infections (Arshad et al. 2005; Gold et al. 1999; Kusel et al. 2007; Kusel et al. 2007; Stein et al. 1999)	Endotoxin (Celedon et al. 2007; Douwes et al. 2006; Litonjua et al. 2002; Perzanowski et al. 1998; Tavernier et al. 2006)
Environmental tobacco smoke (Arshad et al. 2005; Kiechl-Kohlendorfer et al. 2007)	Fireworks smoke exposure (Becker et al. 2000)
Geography (Cohen et al. 2007; Kiechl-Kohlendorfer et al. 2007)	House dust mite allergens (Arshad et al. 2001; Brussee et al. 2005; Celedon et al. 2001; Sears et al. 1989)
Household cleaners/pesticides (Salam et al. 2004; Sunyer et al. 2005; Sunyer et al. 2006)	Housing characteristics (Emenius et al. 2004)
Indoor PM air pollution (Diette et al. 2007; Gauderman et al. 2005)	Maternal Smoking (Gold et al. 1999; Jaakkola and Gissler 2004; Lannero et al. 2006; Sears et al. 1996)
Mould and moisture (Pekkanen et al. 2007)	Outdoor air pollution, including PM and traffic (Brunekreef and Holgate 2002; Clougherty et al. 2007; Kunzli et al. 2000; Nicolai 2002; Salam et al. 2008)(Brauer et al. 2007; Jerrett et al. 2008)
Outdoor pollen (Kihlstrom et al. 2003)	Parental asthma/atopy (Arshad et al. 2005; Celedon et al. 2001)
Pest Allergens (cockroach, mouse) (Gold et al. 1999; Salam et al. 2004)	Pet allergens (cat, dog) (Lau et al. 2005; Ownby et al. 2002; Polk et al. 2004; Salam et al. 2004; Torrent et al. 2007)
Phthalates (Bornehag et al. 2004; Hoppin et al. 2004)	Race/Ethnicity (Miller 2000)
Socioeconomic status (Almqvist et al. 2005; Bergmann et al. 2000; Erzen et al. 1997)	Stress (Kozyrskyj et al. 2008; Milam et al. 2008; Wright et al. 2002; Wright et al. 2005)
Vaccination Status (Gruber et al. 2003)	Weather/Meteorology (Girgis et al. 2000)

Table 2 Overview of the challenges inherent to exposure assessment in cohort studies of complex diseases, organized by stage of study.

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A. Study Development	
-	wide range of sources or activities contributing to a potentially hazardous exposure
-	relatively limited information on which exposures are important
-	cost of measuring exposure
-	burden detailed exposure characterization can place on a subject
-	ethical considerations inherent when measuring exposures in a private residence

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B. Measurement and Data Collection	
-	immense variability in exposure between individuals
-	immense variability in exposures over time within individuals
-	uncertainty about the importance of chronic vs. short term exposures
-	uncertainty about the relevant timing of exposure and windows of susceptibility during development
-	lack of specific, quantitative exposure biomarkers
-	immense variability in biologically available dose between individuals
-	lack of precision and accuracy in environmental exposure measurement, especially as compared with genotype determination.

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C. Analysis	
-	correlation between different exposures as well as repeated exposure measurements
-	problem of exposures occurring prior to enrolment in cohort study
-	difficulty with interacting exposures and interacting genes

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Table 3 Overview of exposure information that can potentially be collected using questionnaires in cohort studies of childhood asthma and allergies.

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Housing characteristics

- Age, building materials, ventilation systems, characteristics of below-grade space, renovations, heating and cooking fuel type, backyard pool or spa (chlorine), attached garages and presences of vehicles

Indoor materials

- Vinyl flooring, carpeting, VOC-based finishes and glues, moisture capturing nutrient rich materials (e.g. dry wall)

Microenvironments

- Transit time in traffic, occupational exposures, time spent in indoor swimming pools, exposure to ETS, cooking and other particulate producing habits

Pets & Pests

- Cats, dogs, rodents, cockroaches

Surrounding Environment

- Vegetation (plants, trees, grasses), traffic levels, industrial and construction presence

Consumer products in the home

- Furniture (component material), blinds, cleaning agents, solvents, electronics, printers, pesticides, herbicides, bedding materials, skin products

Dampness and mould

- Presence, location and extent of damage, moisture evidence

Activities

- Time spend indoors, time spent outdoors, time on floor, frequency of hand-to-mouth contact, storage of toys, sunlight exposure

Socioeconomic factors

- Income, stress

Diet

- Food frequency, method of heating and storage, types of containers used

Infections

- Viruses, upper respiratory infections
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